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John Curwen Collier

It is with considerable regret that we record the death in Melbourne of Mr. J. C. Collier on January 1st. He was particularly well known and admired throughout the length and breadth of the sugar industry and his passing came as a severe shock to his very wide circle of friends.

Mr. Collier, before his transfer to Australian Estates Company head office in Melbourne had been managing director of Amalgamated Sugar Mills Ltd. Among the many responsible positions he had occupied in the sugar industry were President of the Q.S.S.C.T. (1939)Member of the Sugar Experiment Stations Advisory Board (1947-1951), and Chairman of Directors of A.N.P.A.

During his period of service with the Advisory Board, Mr. Collier's wide business experience and his intimate knowledge of the sugar industry were invaluable in the Board's policy framing work.

To his wife and children we extend our deepest sympathy.

Farm Fertilizer Trials

Results of the 1954 Season

By L. G. VALLANCE

Mr. F. DARVENIZA'S FARM, South Johnstone.

Soil type: Red volcanic.
Nature of crop: Second ratoon (Badila).
Age of crop: 14 months.
Harvested: December, 1954.

This trial has completed a full cycle and the results of the yields of the plant, first and second ratoon crops are now available. The figures for the first two crops were published in the April issues of this Bulletin for 1953 and 1954. It will be recalled that this trial was purposely set down on a soil which was well supplied with phosphates and potash. The object of the experiment was to demonstrate to growers cultivating such soils that a substantial decrease in the cost of production could be achieved by paying careful attention to fertilizer requirement. In this area many cane farmers are in the habit of using amounts of fertilizer far in excess of that actually required. Dressings of up to 8 cwt. of mixture plus 4 to 5 cwt. of sulphate of ammonia are frequently applied to soils in which a high level of phosphate and potash has already been built up by unnecessarily heavy applications of fertilizer.

The amounts of fertilizer used in the trial are given below together with the yields produced by them in each of the three crops.

Fertilizer per acre*	Yields, tons of sugar per acre			
	Plant	First Ratoon	Second Ratoon	Total
1. 4 cwt. Sugar Bureau Mixture No. 2 plus 2 cwt. sulphate of ammonia	6.8	5.8	4.8	17.4
2. 4 cwt. Sugar Bureau Mixture No. 2 plus 4 cwt. sulphate of ammonia	6.6	5.6	5.3	17.5
3. 6 cwt. Sugar Bureau Mixture No. 2 plus 2 cwt. sulphate of ammonia	6.9	5.8	5.0	17.7
4. 6 cwt. Sugar Bureau Mixture No. 2 plus 4 cwt. sulphate of ammonia	6.8	5.7	5.3	17.8
5. 8 cwt. Sugar Bureau Mixture No. 2 plus 2 cwt. sulphate of ammonia	6.9	5.7	5.3	17.9
6. 8 cwt. Sugar Bureau Mixture No. 2 plus 4 cwt. sulphate of ammonia	6.6	5.6	5.1	17.3

* Since a green manure crop had been turned in prior to planting the sulphate of ammonia was reduced for the plant cane and for this crop Treatments 1, 3 and 5 received no sulphate of ammonia while Treatments 2, 4 and 6 received 2 cwt. only.

DISCUSSION.

Plant Crop.—The figures show that the 4 cwt. application of mixture produced just as good a crop as the 6 cwt. and 8 cwt. applications. Moreover, since Treatments 1, 3 and 5 received no sulphate of ammonia (see footnote to table) it was quite evident that the 2 cwt. top dressing applied to Treatments 2, 4 and 6 was unnecessary. The amount of nitrogen supplied by the green manure crop which had been ploughed in prior to planting plus the small amount present in the planting mixture was apparently sufficient.

First Ratoon Crop.—The results were again similar to those obtained for the plant crop. In this case, a top dressing of 2 cwt. per acre of sulphate of ammonia was applied to Treatments 1, 3 and 5 and this produced a crop

equal to that obtained from the 4 cwt. dressing applied to Treatments 2, 4 and 6.

Second Ratoon Crop.—The yields from this crop showed some differences which were not seen in the previous ones, *i.e.*, the amount of sugar per acre produced by Treatment 1 was significantly lower than that of the rest. This was not very great but it was definite enough to show that the lower amount of plant food in this treatment was sufficient to cause a reduction in yield. It was also clear that this decrease was due to lack of nitrogen, since Treatment 2 which contained the same amount of mixture but an additional 2 cwt. of sulphate of ammonia gave results which were equal to the heavier applications of Treatments 3, 4, 5 and 6.

Mr. E. F. MILES' FARM, West Plane Creek.

Soil Type: Black clayey.
Nature of crop: First Ratoon (Q.50).
Age of crop: 12 months.
Harvested: November, 1954.

Unfortunately the flood rains of January and February so badly affected the young ratoon cane that a very poor crop resulted. At harvest, it was evident, however, that the applications of sulphate of ammonia and muriate of potash had improved the growth somewhat but there was no response to superphosphate. This same trend was also noted for the plant crop and was reported in the April issue of the Bulletin last year. The responses due to the various amounts of sulphate of ammonia, superphosphate and muriate of potash are given below in tons of sugar per acre.

Fertilizer	Amount	Yields, tons of sugar per acre
Sulphate of ammonia applied per acre	none	0.9
	200 lb.	1.4
	400 lb.	1.5
Superphosphate applied per acre	none	1.3
	200 lb.	1.3
	400 lb.	1.2
Muriate of potash applied per acre	none	.9
	150 lb.	1.3
	300 lb.	1.6

The above figures show that 200 lb. of sulphate of ammonia increased the crop yield by half a ton of sugar per acre. By increasing the top dressing to 400 lb. per acre a further slight increase in yield was obtained; this would probably have been greater if weather conditions had not so drastically interfered with the growth of the cane. Similarly an application of 150 lb. of muriate of potash brought about an increase of 0.6 tons of sugar per acre, with a smaller increase of another 0.3 tons due to a further application of 150 lb., *i.e.*, 300 lb. of potash in all.

Mr. W. BLACKBURN'S FARM, North Eton.

Soil type: Brown clay loam.
Nature of crop: First Ratoon (Q.50).
Age of crop: 12 months.
Harvested: September, 1954.

The use of the various combinations of sulphate of ammonia, superphosphate and muriate of potash produced some interesting results. This will be seen from the figures in the accompanying table, which shows the responses due to the various fertilizer ingredients. For comparison purposes the results of the plant crop are also given.

Fertilizer	Amount	Yields, tons of sugar per acre	
		Plant crop	First Ratoon
Sulphate of ammonia applied per acre	none	5.40	2.49
	200 lb.	6.09	3.91
	400 lb.	6.42	4.90
Superphosphate applied per acre ..	none	5.98	3.95
	200 lb.	5.98	3.75
	400 lb.	5.94	3.60
Muriate of potash applied per acre ..	none	5.94	3.52
	150 lb.	5.97	3.80
	300 lb.	5.99	3.98

DISCUSSION.

Nitrogen.—The definite improvement in yield of sugar per acre that was obtained in the plant crop due to the application of sulphate of ammonia was again repeated in the first ratoon. However, in the second crop the response was much larger, and is typical of the greater nitrogen requirement of ratoon cane.

Superphosphate.—There was no response to the application of superphosphate in either of the crops and the continued used of high phosphate planting and ratooning mixtures on these and similar soils is seriously open to question.

Muriate of potash.—In the plant cane there was no well defined response to muriate of potash although the slight increase in favour of the heavier dressings rather indicated that with continued cropping a potash deficiency might be brought about. That such is the case is well illustrated by the results of the first ratoon crop where a very definite increase in yield was obtained at both levels of potash. It will be seen that 150 lb. of muriate of potash caused an increase in yield of 0.28 tons of sugar per acre, while the 300 lb. dressing increased production by 0.46 tons of sugar per acre.

J. C. V. DOWLING & CO'S FARM, North Isis.

Soil Type: Red volcanic and marginal forest.

Nature of crop: First ratoon (C.P. 29/116).

Age of crop: 12 months.

Harvested: November, 1954.

The soil on which this trial is located is not altogether typical of the true red volcanic scrub soils of the Isis area. It appears to be rather of a marginal type, comprising a gradation to the brown forest soils which frequently border the district soils of basaltic origin.

When the plant crop was harvested a definite response to superphosphate and potash was obtained, but none to sulphate of ammonia. The same combinations of fertilizer were applied to the ratoon crop and the yields due to these are given in tons of sugar per acre.

Unlike the plant crop, it is evident that, in the first ratoon, a very beneficial effect was obtained from top dressing with sulphate of ammonia. The lighter dressing of 200 lb. increased the amount of sugar produced by almost one ton per acre while a further 200 lb. (making 400 lb. in all) was responsible for yielding another 0.45 tons. Undoubtedly this soil type responds very well to nitrogen applications and the value of the green manure crop which was turned in prior to planting is outlined by the fact that no sulphate of ammonia was needed for the plant cane.

Fertilizer	Amount	Yields, tons of sugar per acre
Sulphate of ammonia applied per acre	none	6.35
	200 lb.	7.33
	400 lb.	7.78
Superphosphate applied per acre	none	7.13
	200 lb.	7.05
	400 lb.	7.28
Muriate of potash applied per acre	none	7.06
	150 lb.	6.98
	300 lb.	7.42

The yields from the plots in which the superphosphate and potash were being tested were rather erratic and it was difficult to detect any definite improvement due to these important materials. This is somewhat confusing as an appreciable gain was obtained from both in the plant cane. It is hoped, however, that further information will be available when the second ratoon crop is harvested.

Mr. V. SUOSAARI'S FARM, Bli Bli, Nambour.

Soil type: Brown alluvial clay loam.
Nature of crop: Third ratoon (Q.50).
Age of crop: 11 months.
Harvested: October, 1954.

The results of the plant, first ratoon and second ratoon crops of this trial have already been given in the 1952, 1953 and 1954 April issues of this Bulletin. Each of these crops showed a very definite response to nitrogen but there were no clear cut indications that phosphate and potash were required. Exactly the same trends were obtained in the third ratoon in which the response to the various amounts of sulphate of ammonia, superphosphate and muriate of potash are as follows:—

Fertilizer	Amount	Yields, tons per acre	
		Cane	Sugar
Sulphate of ammonia applied per acre ..	none	17.8	2.46
	200 lb.	26.5	3.94
	400 lb.	32.5	4.87
Superphosphate applied per acre	none	25.5	3.77
	200 lb.	25.7	3.77
	400 lb.	25.5	3.72
Muriate of potash applied per acre	none	24.5	3.67
	120 lb.	26.3	3.82
	240 lb.	25.9	3.78

DISCUSSION.

Nitrogen.—The need for nitrogen on this soil type is well brought out by the fact that a 200 lb. per acre top dressing of sulphate of ammonia increased the yield by nearly 1½ tons of sugar per acre. There was a further response of 0.93 tons to an additional 200 lb. of sulphate of ammonia.

Superphosphate.—As with the three previous crops, there was no

indication of any necessity to apply superphosphate since the application of this material did not produce any increase either in cane or sugar.

Muriate of potash.—Very much the same remarks apply to potash as those given above for phosphate. In the case of potash, however, the plots which received this fertilizer appeared to have somewhat better growth and the yields were a little higher. Unfortunately these were too erratic to signify any pronounced trend.

In summing up the results of this trial it is evident that adequate sulphate of ammonia is essential and it is also considered wise to include moderate amounts of phosphate and potash in the planting and ratooning fertilizer mixtures. This latter practice would help to overcome the drain on plant nutrients that is continually occurring as each crop is taken from the field.

There seems no reason to depart from the fertilizer recommendation suggested last year, *i.e.*, a light dressing of a fertilizer mixture containing moderate amounts of both phosphate and potash, such as Sugar Bureau Mixture No. 2 with a top dressing to plant cane of about 3 cwt. of sulphate of ammonia (unless a good green manure crop has been ploughed in) with an increase to approximately 3½ cwt. for ratoons.

Lime Trials

Mr. E. H. CHURCHWARD'S FARM, Gooburrum.

Soil type: Grey sandy (forest).
Nature of crop: Second ratoon (C.P. 29/116).
Age of crop: 13 months.
Harvested: December, 1954.

This trial had been irrigated since planting and good yields of cane were produced in the plant and both ratoon crops. The method of application of lime together with the amounts applied and the resulting yields of cane are as follows:—

Treatments	Yield, tons of cane per acre			
	Plant Cane	First Ratoon	Second Ratoon	Total
2 tons lime per acre broadcast	53.2	43.2	30.1	126.5
10 cwt. lime per acre in drill	52.0	39.7	28.1	119.8
5 cwt. lime per acre in drill	50.4	41.4	30.2	122.0
No lime	49.2	40.6	27.6	117.4

The responses to the various treatments were not sufficiently definite to be able to reach a firm conclusion that the lime had a beneficial effect. However, the trend right through was for the limed plots to be better than those which received no lime and this is shown by the total figures for the three crops. Moreover, there was little difference between the three lime treatments and it would appear that in this type of soil a light dressing applied in the drill will give just as good results as the heavier and more expensive broadcast application.

The lime applications did not affect the c.c.s. content of the cane in any way.

Mr. J. J. TOOMEY'S FARM, Maroochy River.

Soil type: Alluvial clay loam.
Nature of crop: Second ratoon (Q.50).
Age of crop: 13 months.
Harvested: November, 1954.

The method of application, the amounts of lime used together with the yields of cane are as follows:—

Treatments	Yield, tons of cane per acre			
	Plant	First Ratoon	Second Ratoon	Total
3 tons of lime per acre broadcast	37.2	33.0	31.9	102.1
30 cwt. of lime per acre broadcast	35.4	31.9	36.1	103.4
15 cwt. of lime per acre broadcast	34.8	31.1	31.4	97.3
15 cwt. of lime in drill	34.4	32.2	33.1	99.7
No lime	33.8	31.6	33.6	99.0

Although this trial was taken through to the second ratoon crop no conclusive evidence was obtained to show that lime was beneficial. There were indications that the heavier applications were associated with slightly heavier crops, particularly in the plant cane, but in general the cost of liming this soil seems hardly warranted.

Molasses—Mill Mud—Minor Element Trial

It may be of interest to record here the results of a rather unusual type of trial which was carried out in the Mackay district. In some parts of this district there occur areas of grey soils which are heavy and clayey in texture overlying a yellow clay subsoil at a shallow depth. These fields are very sensitive to weather conditions and set very hard and dry in the dry weather but are wet and waterlogged in the rainy season. Some varieties of cane, because of their capacity to tolerate such conditions, frequently produce a reasonable crop. However, in most years patches of very poor growth will occur and a number of stools may completely die. While the physical condition of the soil in these patches is not good, it does not appear to be greatly different from that where the cane was making better growth.

Under these circumstances, although the use of materials to improve the tilth seemed necessary, it also appeared wise to consider the possibility of a minor element deficiency. Therefore, from 1952 to 1954 a series of trials was carried out using the following materials, both singly and in various combinations:— copper, zinc, molybdenum, boron, manganese, cobalt, sulphur, lime, gypsum, mill mud and molasses. These were used initially in the form of a skirmish trial in which observations were made of the effect of the various materials. Following this, several of the treatments were repeated and set out in a randomised experiment and the cane from the various plots was weighed in order to determine whether any benefits had been obtained.

The results of the investigations proved that no treatment other than molasses had any beneficial effect whatsoever. The following figures give an indication of the yields obtained.

Treatments	Yields, tons cane per acre
Molasses, 10 tons per acre ..	18.7
Gypsum, 2 tons per acre ..	13.5
Molybdenum, 3 lb. per acre ..	13.2
Cobalt chloride, 30 lb. per acre	11.4
Mill Mud, 40 tons per acre ..	10.9
Zinc sulphate, 56 lb. per acre	9.6
Check plots, no treatment ..	14.0

The cane was severely tested by weather conditions. A very dry spring depressed growth shortly after planting and this was followed by a heavy and prolonged rainy season. However, the plots which received molasses were noticeably better and it is most likely that, given a reasonable season, this treatment would have been even more outstanding.

The reason for the increased production due to the molasses application seems undoubtedly to be the improvement in soil physical condition. The tilth of the molasses treated plots was distinctly better than that of the others. No improvement in this respect from the applications of gypsum, lime or mill mud could be observed.

Conference of Cane Pest and Disease Control Boards

The 1955 Conference of Cane Pest and Disease Control Boards is scheduled to take place in Brisbane on 20th April. Hitherto it has been customary to hold these conferences outside the metropolis, but this departure from accepted practice was decided on primarily to fit in with a refresher course on sugar cane diseases which is being organized for the benefit of the Supervisors who are attached to these Boards.

Since the first meeting was convened in Townsville in 1935, Conferences of Cane Pest and Disease Control Boards have rotated among the larger sugar towns lying between Bundaberg in the south and Cairns in the north. The decision to change the meeting place each year was very wise since it provided delegates with an opportunity to witness the effects of those pests and diseases which were not present within their own areas. In addition it broadened the experience of the supervisors and inspectors, on whose efforts and initiative the successful operation of most Boards is so largely dependent.

With the elimination of such diseases as gumming, Fiji and downy mildew from the commercial cane-growing areas it became no longer possible for supervisors to acquire experience with these diseases in the field merely by visiting other cane-growing centres. Furthermore, since some of these diseases disappeared some considerable time ago and many supervisors entered the industry within comparatively recent years, it became evident that there was an increasing number of supervisors who were quite unfamiliar with some of the major diseases. Although we have every reason to believe that the three diseases previously mentioned will remain permanently eradicated, it is undesirable to be lulled into any false sense of security by assuming that they will never re-appear; hence all supervisors should be prepared for every eventuality and should be able to recognize all the important cane diseases and take steps for their control.

To that end it has been arranged that a refresher course on sugar cane diseases and their control will be held in Brisbane on 18th and 19th April, when supervisors will be afforded the opportunity of becoming familiar with most of the important cane diseases now assembled on the Bureau's pathology farm at Eight Mile Plains near Brisbane. It is on this property where most of the disease resistance trials and other disease investigations are at present being conducted, and a good array of disease symptoms should be available for inspection.

By holding the Conference of Cane Pest and Disease Control Boards immediately afterwards, duplication of travelling should be eliminated and discussions on the multiplicity of subjects that are likely to be raised will undoubtedly be based on firmer foundations.—R.W.M.

Annual Field Day at Meringa

During the period of the Technologists' Conference at Cairns—April 28th to May 4th, 1955—the opportunity will be taken to hold the Annual Field Day at Meringa Sugar Experiment Station. This function will take place on Friday, April 29th, and will follow the normal procedure. The Station will be open from 10 a.m. and visitors will be taken around the various blocks by members of the staff and shown the work which is being performed. A light luncheon will be served, and this will be followed by a few short addresses on topical subjects. The usual display of tractors and implements will be arranged. An invitation is extended to all persons directly or indirectly connected with the industry to attend.

Vigorous Seedlings

By J. H. BUZACOTT

During the 1954 seedling raising season at Meringa, crosses with a variety of *robustum*, 51 N.G.63, exhibited outstanding early vigour in the seedling flats. Out of a total of more than 200 crosses planted in the glasshouse for the season there were five in which the male parent used was 51 N.G.63. All these crosses germinated rapidly and showed marked early vigour but the most outstanding was the cross Badila x 51 N.G.63. Seedlings of this cross were readily visible two days after planting, whereas in other crosses it is two and a half to three days before the young shoots are able to be seen.

Fig. 70—Showing great comparative vigour of the cross Badila x 51 N.G. 63 in the flat on the right.

Apart from the rapid germination of its seed the seedlings from this cross grew at a far more rapid rate than any others in the glasshouse. The picture in Fig. 70 shows a comparison between the vigour of Badila x 51 N.G.63 and that of normal seedlings. The flat on the right contains seedlings of Badila x 51 N.G. 63, whilst that on the left contains seedlings of the cross D.285 x I.202, which exhibited the normal vigour of most crosses represented in the glasshouse. Seed from both crosses was sown on the same date and the photograph was taken some four weeks after planting. The much greater vigour in the right hand flat is quite apparent in the photograph.

51 N.G.63 is one of the wild varieties of cane known as *robustum* collected by the Bureau of Sugar Experiment Stations' 1951 Expedition to New Guinea. Some interest is attached to the collection of this particular variety. It was found at Ulenofi in the Komperi Valley at the head-waters of the Purari River. In this area downy mildew disease was very bad. Of a number of varieties of *robustum* seen growing in fences around native gardens, one with outstanding vigour showed no downy mildew disease. This indicated that the variety possessed a high degree of resistance to that disease since practically every other variety of *robustum* seen there was to a greater or lesser degree affected with downy mildew. Both on account of its vigour and its apparent disease resistance the variety

Fig. 71—The village of Ulenoft in New Guinea where 51 N.G. 63 was collected.

Fig.72—The Komperi Valley at the head waters of the Purari River.

was collected and its serial number became 51 N.G.63. When the expedition returned to Aiyura and proceeded to despatch to Queensland the canes obtained at Ulenofi, 51 N.G.63 was missing and had either been left behind at Ulenofi or had fallen out of the jeep on the return journey. The Agricultural Officer at Aiyura, Mr. Schindler, kindly offered to collect the variety again during his next trip to Ulenofi in several weeks' time. In due course, shortly after the return of the Expedition to Queensland, plants of the missing 51 N.G.63 arrived from Mr. Schindler, and it is now well established and growing vigorously among the parent canes at Meringa.

Bureau Levy Reduced

The Sugar Experiment Stations Board, at its meeting on February 9th-10th, decided to reduce the levy from 4d. to 3d. per ton of cane for the 1955 crop. Since the levy is paid equally by miller and grower the decision means that the cane growers will pay 1½d. per ton of cane delivered to the mill, and the miller will pay an equal amount.

Between 1901 and 1933 the proclaimed levy for Bureau of Sugar Experiment Stations purposes ranged from ¼d. to 1d. per ton of cane, but during those years the Government subsidised the assessment £ for £. In 1934 the Government's contribution was limited by Act of Parliament to a maximum of £7,000 per year. As a result of that action the amount contributed by the industry rose, and between 1934 and 1950 the levy varied from ½d. to 2d. per ton. Rising post-war costs brought about further increases in 1951 and 1952 to 3d. and 4½d. per ton, but since then the reduction has been progressive, being 4d. in 1953 and 1954, and now decided at 3d. for 1955.

It is interesting to record that whereas Bureau staff in 1930 amounted to 21 persons, the strength now stands at 61—accounting in considerable measure for the increased levy.—N.J.K.

Trace Element Trials in the Innisfail Area

By J. ANDERSON

In the Innisfail area, as in other cane centres throughout the State, trials have been conducted over the years to detect possible deficiencies in the soil of minor plant foods. A series of such trials was again set out in this centre last year on sites which covered a wide range of soil types. The locations selected were mostly in blocks or patches where the cane did not produce as well as might be expected.

The six elements used and the rates at which they were applied were as follows:—

Copper sulphate	at 56 lb.	per acre
Zinc sulphate	at 56 lb.	,, ,,
Borax	at 30 lb.	,, ,,
Manganese sulphate	at 30 lb.	,, ,,
Cobalt chloride	at 2 lb.	,, ,,
Sodium molybdate	at 3 lb.	,, ,,

Young first ratoon cane was chosen (poor patches and cropping being noted from the plant crop) and the first named five compounds were used as a dry powder dressing to the stool, while the lastmentioned compound was applied as a spray to the young foliage.

In previous years the trace elements were tested singly, but in this series of trials the six chemicals were applied as a mixture to each selected site. The reason for this was not only to facilitate work, but also because of the possibility of the poor growth being caused by a deficiency consisting of a combination of two or more elements. If any response were obtained then further trials would be required to determine which element or elements were missing.

Observations were made throughout the growth of the cane crop, but as in previous trials no responses were visible in any of these experiments. However, because of the wide range of soil types and growing conditions which exist in this area, it is proposed to continue this type of investigation as time permits.

Some Ideas on Fallowing

By E. A. PEMBROKE

Apart from ploughing out old cane stubble, bumper discing and sowing a green manure crop, the practice of fallowing would scarcely seem to warrant attention. However, the battle against time and costs has caused a few growers in the Mulgrave Mill area to deviate from the usual fallowing practices, and the results achieved by these few are encouraging others to follow suit.

Fig. 73—Velvet beans sown in plough furrow on red schist soil.

The usual bumper discing after plough-out has been dispensed with, the land being left in the rough state. The result of this is that the old stools tend to dry out more completely and less volunteering results. When the land is bumper disced many of the old cane stools are chopped up and small pieces are buried three or four inches deep where, after rain, they may volunteer. Bumpering also makes a finer seed bed for weeds and grasses to germinate. In unbumpered land the lumps weather down quite well and because of the uneven nature of the surface, the land absorbs all rain that might be received from passing showers or storms. Run-off from storm rain is almost negligible. One big factor favouring land being left in the rough state after ploughing out is that the time and cost which would be absorbed in bumper discing is a direct saving to the grower.

Legume sowing might be thought to present a problem under these conditions as it would be impracticable to use machines owing to the large clods present in the block. To overcome this defect several methods of sowing green manure crops have been employed. Where Reeves Selection, Cristaudo Pea or velvet beans are sown the seeds are broadcast over the surface. The majority of these fall between the lumps where they are shaded from the direct sun and are covered by soil washed down during the first rain. Velvet beans, however, do not lend themselves readily to surface broadcasting as, should surface moisture conditions be inadequate, they will not

germinate until this has been replenished. However, the new velvet beans like the old Mauritius types will germinate at a much greater depth than other legumes and this fact has given rise to two other methods of planting which obviate the necessity for broadcasting on the surface.

1. The seed is broadcast on the surface and ploughed in with the stubble. The cost of velvet bean seeds has been greatly reduced this year and this encouraged broadcasting, but should the cost rise again no doubt this practice will lose favour.

2. Some growers prefer to sow velvet beans in rows chiefly from the point of view of seed economy and cost. To achieve the row planting effect the seed is dropped by hand in the plough furrow on every second or third round of a two-furrow plough. One grower did this himself whilst ploughing and claimed he did not find it inconvenient to do both jobs at once. The seed was held in a box fitted to the top of the mudguard of the tractor. An alternative method is to have the seed sown by a person either standing on the drawbar of the tractor or walking behind the plough.

Whether the seed be broadcast and ploughed in, or dropped in the plough furrow, excellent germinations have been obtained for the past two or three years. The great advantage of ploughing in velvet beans is that there is usually good moisture content at plough depth whereas the surface soil might be too dry to effect a germination.

Once the green manure crop has reached maturity the usual ploughing in may be dispensed with. Instead the crop is bumpered and cross bumpered several times. Bumper discing can be done much more quickly and cheaply than ploughing. Though more operations are necessary the time and cost involved is not much greater than that of the conventional method, particularly when it is considered that the land is often ploughed and bumper disced two or three times prior to planting. Besides chopping up the green manure, bumper discing also mixes it in the top three or four inches of soil where it forms a mulch whereas, when ploughed, much of the green material is turned to the bottom of the plough furrow. Vegetable matter decomposes much more rapidly on the

Fig. 74—Velvet beans sown in plough furrow on a clay-loam soil.

surface and the mulching effect, besides protecting the soil from packing in the event of unexpected rain, brings the soil underneath into a good condition of tilth.

On the more friable soil types it has been possible to have the land in a good state of tilth with only one ploughing and grubbing apart from the original plough-out whilst on the heavier clay soil types it may be found that a second ploughing or grubbing may be necessary.

The practices described are presented for the consideration of growers in other areas. It will possibly be found that apart from actually reducing costs the elimination of certain operations in fallowing and seed bed preparation will make valuable time available to the grower so that he might effectively perform those myriad of other operations which clamour for attention at the approaching end of the current season or the commencement of the new.

Unsatisfactory Control of Guava Bushes by Hormone Sprays

Enquiries are received from time to time concerning the value of spraying guava bushes on waste land with hormone weedicides in order to cause their eradication.

Some twelve months ago a dense patch of guavas in the Innisfail area was sprayed with a commercial mixture containing 20 per cent. 2,4,5-T and 20 per cent. 2,4-D. This was used at the recommended strength for woody plants of 1 : 120 with water, plus a wetting agent. The bushes were some three feet in height and one inch or more in diameter at the base, but old and stunted from growing on a poor hillside and from animal damage. Wetting of the bushes during spraying was thorough, and greater than that which could be expected under normal circumstances.

Within the first two weeks the leaves yellowed and dropped, and the growing tips blackened. Gradually most stems, after remaining green under the bark for months, died. However, one or two stems per bush eventually reshot from the lower half, or from ground level. Although the subsequent growth of these was very poor it was evident that satisfactory eradication had not been achieved.

Reports from various growers who have used a 2,4-D/2,4,5-T mixture have been much the same as those mentioned above. Possibly a stronger mixture than that used, a second spraying after perhaps six months, or the use of 2,4,5-T alone might have given better results. However, the large quantity of solution required per acre and the high cost of the material, plus labour to effect through wetting, makes the spraying practically prohibitive in the majority of cases. Secondly, to some extent, the prolonged process of death, even if a satisfactory kill could be obtained, would not meet with general approval.

While spraying of bushes cannot be recommended from the experiences in this area, attempts by growers should be directed to small suckers or young tender plants. In this respect it might be mentioned that the effect of a similar spraying on some tall bushes up to 15 feet in height was so slight as to be of no consequence. Further, many instances of spraying with 2,4-D alone, other than yellowing the leaves and causing growing tips to blacken, have not been effective.

S.O.S.

Fig. 75—The formerly grub infested lands of Boogan area. This photograph was taken from the fire-devastated Basilisk Range.

Fig. 76—South Johnstone area looking west from the Basilisk Range.

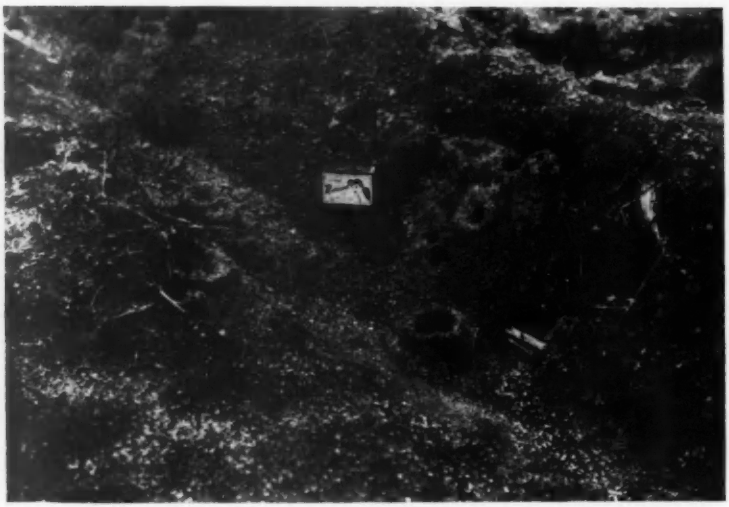

Fig.77 —Funnel ant craters two days after disc cultivation of ploughed land. These ants affect cane crops at Tully and are the subject of investigations with a range of modern insecticides.

Fig. 78—This was a common sight some years ago. The good strike on the right is from grub affected plants; the poorer strike on the left from plants which were not grub affected.

Fig. 79—Preparations for planting a ratoon stunting disease trial. Each variety and treatment is bundled separately.

Fig. 80—In preparation for cross pollination the arrowed stalks are stripped of leaves, stood in a chemical solution and the arrows protected by crossing lanterns.

Fig. 81—The Blundell cutter-dipper-planter. The plants are automatically dipped in a mercurial solution before dropping down the planter chute.

Fig. 82—Hot-water treated Q.57. This cane was ten months old when photographed on a Mulgrave farm.

Beneficial Effect of Drill Bottom Compaction in the Wet Belt

By J. ANDERSON

In the wet belt of the Tully, Innisfail and Babinda areas, cultural practices, as would be expected, differ in many respects from those of other districts of the State. Possibly one of the greatest differences lies in the long established and most popular method of "planting by the stalk."

The method was described in detail in the April, 1952, issue of the "Cane Growers' Quarterly Bulletin" by N. G. Graff. Briefly, it consists of a number of separate operations, namely:—

(*a*) Opening the drills.
(*b*) Dropping the cane in the full stalk into the drills from a lorry, cart or trailer.
(*c*) Cutting the cane into setts by hand.
(*d*) Covering the setts in the drills.

Fertilizing is performed either as an additional operation or in conjunction with the opening or covering of the drills.

While the central and southern grower, used to cutter planters, is always interested by the foregoing procedure, he is even more intrigued to observe a vehicle, often a heavy motor lorry carrying several tons of cane, running along the bottom of the drills, rather than the tops of the interspaces. The usual practice is, with the lorry unattended and slowly running along the drills (Fig. 1), for the farmer and his men to throw the cane into the two drills behind the lorry and one or two to each side, *i.e.*, filling usually two, four or six rows with the one run of the vehicle. After the passing of the loaded vehicle, the bottoms of the "lorry drills," frequently quite moist, are compacted so hard that usually a mattock or steel pointed tool is required to make any impression on the soil. The interesting feature is that not only is a much better and more rapid germination obtained, but the improved growth of the early cane stand frequently distinguishes the rows until the cane passes the "out of hand" stage.

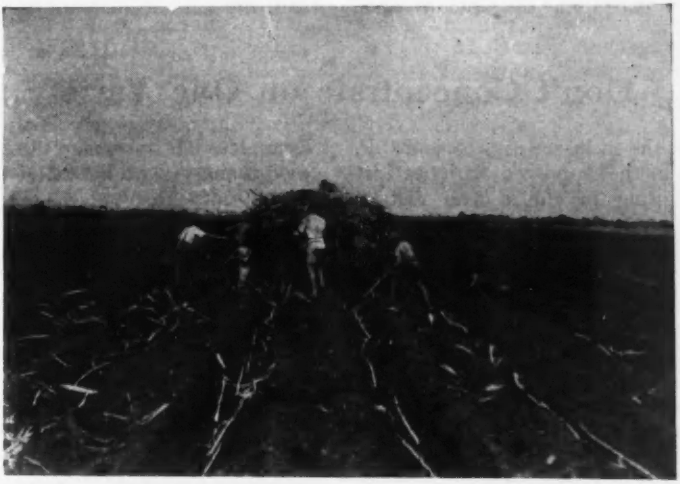

Fig. 83—Illustrating the dropping of full stalks in the open drills. Cane knives are used to cut the stalks into plant lengths before covering with soil.

One most successful practice is to mount dual drill ploughs in front of the rear tractor wheels, and as drilling is performed a loaded trailer is drawn along these two newly opened drills into which the cane stalks are dropped. In turn, after cutting the stalks into setts, covering is performed with tynes mounted in front of the rear wheels of the tractor in like manner to the drill ploughs. With this procedure, the bottom of every drill receives firstly two compactions from tractor and trailer when drilling and planting and a subsequent one from the tractor when covering—a total of three. On heavy alluvial land, the concrete-like state of the soil below, around and above the sett can well be imagined.

The lorry in the drill never fails to rouse the interest of the canegrower visitor and quite justifiably he asks: "What is the sense of ploughing and deep grubbing to loosen the soil if it is to be immediately hardened again?" The reason for the success of the deep compaction is perhaps the formation of a firmer seed-bed, and, with freedom from lumps, a better contact of the sett with the soil and moisture is obtained.

Don't Concentrate on One Variety

With the inclusion of Q.58 and C.P. 29/116 in the Approved Varieties List for planting in the central district during 1955, it would be as well for growers of the area to take a second look at their proposed planting programme for this year.

For the last few years approximately 80-85 per cent. of the cane planted in this district was of the variety Q.50; in several instances, whole farms have been planted to Q.50. This position has arisen because of a combination of the following circumstances:—

Firstly, the unavailability of an early and (with the exception of Q.28) a late maturing cane suitable to the class of soil predominant in the area and, secondly, the deservedly high reputation already gained by Q.50, which in the 1953 season headed the varietal list for the State with a total of 2,405,069 tons, it's nearest rival—Trojan—producing some 800,000 tons less.

It would be as well to remember, however, that Q.50 is primarily intended for use as a mid season cane and that, subject to weather conditions, this variety is particularly susceptible to red rot from the end of October onwards, with resultant heavy loss in c.c.s. The variety C.P.29/116 has demonstrated its ability to produce good tonnages with a c.c.s. of 13.5-14.5 if left until the end of the season. Furthermore, C.P.29/116 is not subject to attack by red rot, which may result in Q.50 being condemned by the mill at this time of the year. For this reason it is suggested that, on poorer class soils, incapable of growing late maturing varieties such as P.O.J.2878, Q.45 or Trojan, growers plant sufficient C.P. 29/116 for the last five or six weeks of the crushing.

Several trials over past years have plainly shown that Q.58 is, as a rule, one or two units ahead of Q.50 in June and July and, at times, even in early August. The satisfaction to be obtained in commencing the season with a cane producing a c.c.s. of 13 as against 11 or 12 can be fully realised. Q.58 does well on either poor or better class soil.

Apart from the obvious benefit of avoiding a loss in sugar due to disease, it is apparent that restriction to farm peaks will result in a decrease in tonnage for most farms. If growers are not to suffer a considerable financial loss, one answer is the planting of varieties which will produce more sugar at the beginning and end of the crushing season.—C.L.T.

Maintenance of Satisfactory Water Penetration on Irrigated Soils

By R. B. MOLLER

The difficulty experienced in obtaining satisfactory water penetration is a problem common to farmers of most old cultivations. In dry farming areas it is imperative that as much rain water as possible be absorbed by the soil. It is also in the best interests of farmers in irrigated areas to have their soil in the most suitable condition for absorbing irrigation water as well as rain.

At the present time in the Lower Burdekin area it is quite common to see a few acres of new land added to old existing fields. Invariably the virgin soil produces a heavier, more vigorous crop even though farm practices are uniform for the field. Where nutrient supply is adequate, the better growth can be attributed, in part, to better water penetration and superior water holding capacity of the newer soil.

From the practical viewpoint, soil aggregation in a virgin soil under natural conditions may be regarded as being at an optimum for that particular soil type, *i.e.*, a maximum number of separate particles of sand, clay, silt, etc., are cemented together by organic and inorganic substances into small crumbs or granules. These granules fit loosely together and allow free circulation of air and moisture within the soil. They also absorb and retain fairly large quantities of water. Consequently, well aggregated soils do not dry out nor do they waterlog as quickly as poorly aggregated soils. As organic matter is a very important cementing agent in the formation of granules in most soils, its loss causes a breakdown of structure and with it many desirable soil characteristics.

Beneficial Effects from Liming.

Continuous use of irrigation water with even a slight salt content affects the nature of the clay, and eventually produces a soil which tends to puddle when wet and then dry out with an impermeable surface layer. This type of soil is extremely hard to wet to any appreciable depth. Anything which improves structure will improve water penetration of the soil. Of the various methods available to Burdekin farmers the use of lime promises to be most satisfactory. Lime performs many functions in relation to the growing plant, many of which are not clearly understood. Probably the major functions are:—

(1) Neutralising acidity in the soil.
(2) Improving soil physical condition.
(3) As a plant food.

At this stage it should be pointed out that a soil analysis shows whether lime is needed to neutralize high acidity but will not indicate whether the use of the lime will improve the physical condition of the soil generally.

In the Burdekin area, the benefit of a two to five ton application of lime is best seen on clay soils and in particular those soils which have been scoured by previous floods, although benefit may also be obtained by liming some of the lighter soil types. It is generally accepted in this area that after liming the time required for water to run the length of a row is often doubled, thus indicating the increased ability of the soil to absorb water. Frequency of irrigation may also be decreased since the soil retains water for a longer period.

Improved aggregation may result through lime counteracting the injurious effect of a salty irrigation water. Maximum beneficial effect is obtained when each particle of lime comes in contact with a soil particle. For preference, lime should be applied to fallow land in fine tilth, and then thoroughly worked into the soil. With a good quality, finely-divided lime, results should be evident within a year. The leaching action of water will gradually carry some of the lime down through

the soil profile and allow greater root penetration due to better aeration and drainage in the subsoil.

Although lime is of very real value on many soils, as already mentioned, it is difficult to predict accurately its effect on any particular soil type. Therefore, use of lime to improve unfavourable soil conditions is largely a question of trial and error and may sometimes prove disappointing to the farmer. If the desired results are not forthcoming it may be assumed that—

(1) the particular soil will not react favourably to lime or,
(2) insufficient lime has been applied or,
(3) a poor quality product has been used.

Value of Green Manuring.

Bacterial action and erosion are the major causes of loss of soil organic material. The former is continuous under warm, moist conditions. Green manure crops are of value in replenishing the organic matter of the soil. Owing to the succulent nature of the crop, decomposition is rapid with high temperatures and adequate moisture and the resulting products of decomposition assist in the formation of soil aggregates. The growing of green manures such as velvet beans should therefore be regarded as an essential farm operation since the organic material produced will at least help to prevent the soil physical condition from becoming worse.

Molasses can be used to assist in improving soil structure by virtue of its organic matter content, also through stimulating bacterial activity. Due to this latter effect coarse organic material is broken down and although some products of decomposition are leached from the soil, others go to form more permanent soil humus.

Disease Control and Farm Rotation

By R. W. MUNGOMERY

Two proclamations that were recently issued in respect of the Inkerman and Plane Creek mill areas require, in addition to the use of clean planting material, that all diseased fields must not be allowed to continue growing during the fourth year after the calendar year of planting, unless with the express permission of the Director of Sugar Experiment Stations. That is to say, all diseased fields should normally be ploughed out after harvesting the second ratoon crop, unless they are the subject of some order which specifically requires their destruction at some earlier date. This requirement should not entail any hardship since the normal farm routine throughout most of Queensland's sugar areas is to harvest from each block a plant, first and second ratoon crop, and then fallow. In the Inkerman and Plane Creek areas, however, where the majority grow only plant and first ratoon crops, compliance with this requirement should be an even easier matter.

Next year it is expected that similar proclamations will be issued in respect of the remaining mill areas of Queensland, and although favourable consideration will be given to extending the cropping cycle in cases where some genuine hardship would be entailed by the destruction of the blocks in question, it should also be understood that there is no intention of making indiscriminate exemptions from the requirements of these proclamations when, by so doing, it would merely prolong the growing of diseased crops and endanger nearby plantings of healthy cane. Most fields of cane that were planted with cane not derived from hot-water treated stocks must be regarded as either suspect or diseased with ratoon stunting; therefore there are grounds for assuming that most of the older ratoons, at least, are affected with some disease or another.

Recently a case came under our notice in which a grower, who sought relief from the terms of a disease order,

had a greater acreage of third ratoons than the combined total of his plant and first ratoon blocks. Obviously he had not been conducting his farming operations in accordance with any well-planned programme. Unless such situations are quickly rectified a grower may find, when these new proclamations come into force, that he is called on to plough out a greater proportion of his farm in one year than should normally be the case. When this happens, the only alternative in maintaining the net harvestable area is to plough out and re-plant without any intervening fallow period. This, in itself, is not a good farm practice, quite apart from the obvious danger of encouraging the growth of volunteer stools of diseased cane in the midst of the new plantings of clean cane.

The objective, then, should be to maintain the farm blocks in some degree of uniform rotation, and this timely hint is submitted in the hope that those growers who come within this category will take steps during 1955 to rectify what otherwise might involve them in a very difficult situation.

Cane Killing Weed in Old Cultivation

Increased assignments have led to the clearing and planting of a large area of forest country in the Mackay district. There have been reports of damage, severe stunting and sometimes death of stools, due to the presence of cane killing weed, or Striga, as it is commonly known.

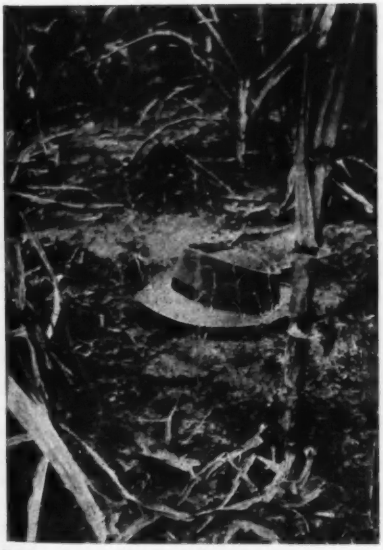

Fig. 84—The small cane killing weed can be seen in front of the hat.

Previously, it was thought that Striga was a pest of new land, but recently there have been some reports of it occurring on old cultivated ground.

In one particular instance, during the fifth year of cultivation of a block, the presence of young green shoots of the weed, midst quantities of dead plants of Striga, was confirmed, although it was late autumn. This was unusual, as the plant's life cycle has usually ended by then.

This block, situated on the crest of a hill, could not be infested by water-borne seed. Striga was found to be growing amongst grasses on the narrow headland surrounding the block, but the infestation had been so heavy that the seed must have come from some other source as well. Erosion and constant cultivation must have allowed previously deeply buried seed to germinate.

Striga is easily controlled by spraying with the hormone weedicide 2,4-D at the rate of 1 lb. to 40 gallons of water. It is advisable, after ploughing out an infested block to plant it to a green manure crop, as this assists the germination of any seed present, whilst the growth of any such seedlings would be too weak for any future seed setting

Legume Trials in the Innisfail Area

By S. O. SKINNER

The Bureau, continuing its work to obtain better varieties of legumes for green manure crops, last year tested four new selections of the cowpea-Poona pea type throughout all sugar areas of the State.

In the Innisfail centre, the tests were conducted as farm trials in direct comparison with plots of the standard varieties already in use and well known in many districts. Although the new ones were not outstanding, the overall observations, particularly of the standards, may be found of interest in view of the oft asked question: "Which is the best legume for this area?"

The legumes tried were:—

(1) A mixed planting of velvet bean and Reeves' Selection. (2) Mung bean. (3) Reeves' Selection. (4) Cristaudo pea. (5) Poona pea and the four new cowpea varieties—(6) CPI 9247. (7) CPI 9248. (8) CPI 11044. (9) CPI 12377.

The trials were planted in November and, as the season proved very favourable, all made good growth. Mixed planting of the velvet bean and Reeves' Selection proved far superior to the rest. The rapid growing Reeves' Selection gave a good early cover, and this was followed by the large dense crop which is characteristic of the velvet bean.

The Mung bean plots produced the second best crop with CPI 11044 filling the third position. There was little difference between the Reeves' Selection and Cristaudo pea. The other three new legumes were not particularly attractive, while Poona pea was the least impressive because of considerable death from wilt.

The trials substantiated previous views and again demonstrated the superiority of velvet bean as a green manure crop. It withstands prolonged dry spells and excessive wet conditions equally well, and is comparatively resistant to bean fly and wilt disease attacks. It produces the heaviest bulk of organic matter and while it has a long period of growth, a full crop can be obtained in the normal fallow period of this district. Although planting in drills has not been attempted here to any extent, excellent results with this method have been obtained in other areas. For broadcast planting, the practice of mixing the seed with that of a quick growing legume such as Reeves' Selection to secure early cover and compete with weed growth is sound.

Mung bean, a comparatively new green manure crop for cane lands, has met with wide and rapid popularity. The large leaf gives good smothering effect, and with a semi-erect type of growth it produces an impressive crop. However, it does not yield such a heavy ground mulch as the velvet bean and in this respect its heavy crop appearance may be somewhat misleading. A disadvantage is its susceptibility to a leaf disease; this causes the leaves to turn yellow and drop off, thus leaving the ground exposed and allowing rapid weed and grass development.

Reeves' Selection and Cristaudo pea, the former being preferred to the latter, are both quick growers with good cover. They withstand wilt reasonably well and this is an important factor in the Innisfail area. Poona pea, also a quick grower with good cover, is nevertheless unreliable. It is most susceptible to wilt disease which causes severe dying out under wet conditions.

These four new legumes are being tested again during the present 1954-55 fallow period. Should CPI 11044 maintain its superiority over such standards as Reeves' Selection and Cristaudo pea, it will have proved itself to be of considerable value. In such a case, seed of it (or of any of the other three if justified) will be made available in order to produce sufficient supplies to satisfy the sugar industry's requirements.

Control of Para Grass in a Mill Drain

By C. L. TOOHEY

A problem confronting one of Mackay's mills has been the control of heavy para grass (*Brachiaria mutica*) in a drain which handles approximately 250,000 gallons of waste water per hour. In past years it has been necessary to have men work in mud the three-quarter mile length of the drain and laboriously clear it by brush hook, whenever it became overgrown. This meant the annual expenditure of some hundreds of pounds.

On the 22nd September, 1953, when the drain was completely infested with the grass, TCA (sodium trichloroacetate) at the rate of 40 lb. per 100 gallons of water was applied. A total of 80 lb. was found necessary to cover the three-quarter mile length of the drain, which is six feet deep and ten feet wide. An area seven feet back from each bank was covered. The rate of application, therefore, approximated 36 lb. per acre.

This had the effect of killing off the top growth of the grass, although the stool persisted. On the 6th December, 1953, the drain received an additional 80 lb. of TCA in 200 gallons of water, but as it was not necessary in this treatment to spray the drain width itself—top growth and runners in the drain having been killed off by the first spraying—this increased the usage of weedicide to 63 lb. per acre. Following this, the effects of the soil sterilizer became more apparent but the stools of grass did not die out completely.

The drain was sprayed for the last time on the 29th December, 1953, receiving 15 lb. of TCA in 200 gallons of water for the full length of the drain, seven feet at the top of either bank again being sprayed. The rate of application in this instance was, therefore, 7 lb. per acre. When inspected three months later, the drain was completely clean and most stools were apparently dead, although regrowth had started to occur from some.

In the three sprayings, therefore, a total application of 175 lb. of TCA was made. At the ruling prices of TCA this would cost £43/15/-. Two men were necessary to handle the spraying equipment on each occasion. As these were paid the award wage, wages amounted to £5/3/4 per day or a total of £15/10/- for the three days. Thus we have a cost of:—

Material	..	£43	15	0
Wages	..	15	10	0
Total	..	£59	5	0

This compares very favourably with the hundreds of pounds spent annually on manual cleaning of the drain. It seems certain that spraying will have to be continued for at least two years to eradicate the grass completely, but the saving in time, labour, and money will still be considerable.

Excellent results with TCA against para grass were also achieved on the Central Sugar Experiment Station when a small area of the grass in a station drain was first mown, and then separate plots sprayed at the rate of 100, 50 and 25 lb. per acre, on the 28th December, 1953. Following heavy rains in January and February, when water lay in the drain for a period of up to six weeks, it was discovered that a complete kill of the *Brachiaria mutica* had been achieved in the plots sprayed at the rate of 100 and 50 lb. per acre, while 65 per cent. control was obtained in the 25 lb. per acre plot.

It is possible that had an original application of 100 lb. per acre been made to the mill drain, the third, and even second application could possibly have been eliminated. However, it must be remembered that on the station the trial was under water for a period, ensuring a ready passage of the poison to the grass roots. A most important feature in the control of *Brachiaria mutica*—or any similar grass—by TCA is the necessity for a free soil with ample moisture present to carry the poison to the grass roots.

Trailer-Trains for Cane Haulage

By O. W. D. MYATT

In Queensland, although the method of cane delivery varies considerably, it is nevertheless based essentially on either the use of portable tram line or by extensive motor transport by a conventional lorry type, from the field to the mill, tram or rail head.

Whilst in several districts some use is made of a small single-sling trailer, it is interesting to record a unique method of cane haulage which appears confined to the Ingham Line—Invicta mill area. Here all growers, faced with the annual problem of cane loading on standard gauge rail trucks, have, over recent years, developed a preference for the use of a trailer-train as a means of cane transport from farm to rail siding in an endeavour to counter long haulage costs. To-day the use of the tractor two trailer train (Fig. 85) or the motor truck two trailer train (Fig. 86) has been adopted as standard harvesting equipment.

The two trailer load, with an approximate maximum of twelve tons allows sufficient cane for the standard F.G. rail truck which normally forms the majority of waggons loaded, whilst the addition of the lorry load where necessary allows ample cane for the larger H. waggon.

The trailer itself (Fig. 87) is of local design and consists essentially of a long wheel base truck chassis, sufficient length being necessary to enable a two or three sling loading of some six tons. Trailer measurements vary with design but average figures show a wheel base of 13 feet, a platform measurement of 17 feet by 6 feet and a platform height of 30 inches, the latter enabling an easy loading lift in the field. It can be seen that the trailer in the accompanying photo has retained the use of the rear dual wheels, and, though not essential, they have proved an added asset in countering the trailers dead weight disadvantage under wet field conditions.

The price paid for old motor vehicles suitable for trailer conversion is hard to assess but the general aim is a figure which allows the finished trailer to cost up to £200.

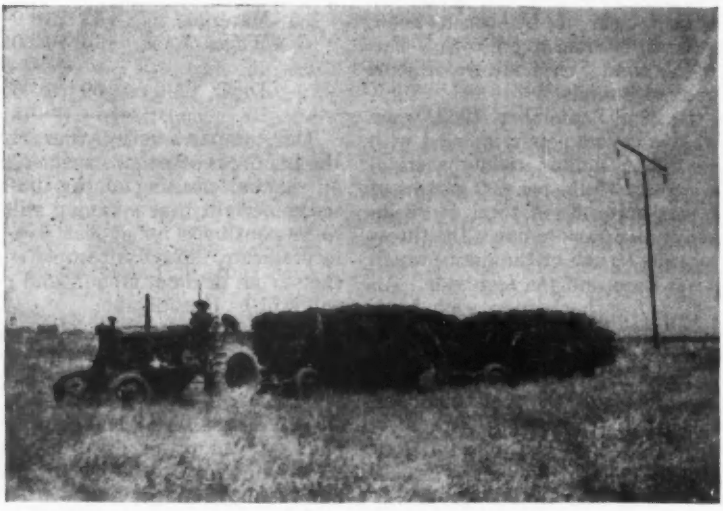

Fig. 85—Tractor drawing two trailers each having a capacity of six tons.

Fig. 86—Motor truck with two trailers. In the aggregate the load is sufficient for an H. waggon.

The outlay for the trailer is therefore low in comprison with the more conventional motor truck, and its ease in loading, plus mileage and time saved by the use of a trailer train, gives it added advantages over other forms of transport under the existing local conditions.

Fig. 87—Close-up of the trailer.

Random Gleanings

Recent trials with front end loaders highlight the problems to be faced and difficulties to be overcome before mechanical harvesting and loading will satisfy the industry. Some of the factors still causing dissatisfaction are tops and soil mixed in with the cane, the scavenging action of loaders, excessive manoeuvring when loading trucks, necessity to ride over portable line during the manoeuvring and consequent damage to tractor tyres. Front end loading of cane had its genesis in Louisiana where the cane lies across an interspace ditch and can be picked up without soil disturbance. It is obvious that some improvement in design of the loader is desirable in Queensland if clean cane is to be sent to the mills. On hard, compacted soil this problem barely exists, and the loaders can do a good job, but care is still necessary to keep the severed tops well away from the cane stalks.

The Sugar Experiment Stations Board has now approved plans and specifications for a new brick building on the Mackay Sugar Experiment Station. This will replace the 55 year old wooden building which has served as office and laboratory since the passing of the Sugar Experiment Stations Act in 1900, and which was moved from the Lagoons to Te Kowai in 1935. The new building is designed on modern lines and will look after the Bureau's requirements in that district for many years to come. In addition to the extension staff now stationed in that area it is proposed to make Mackay the centre of agronomy investigations and, in addition, to have a resident soil chemist and mill technologist. The growth of Bureau services to the industry, together with the steadily increasing staff, has created a need for more extensive accommodation and for more modern laboratories. It is planned to commence building operations at the end of the 1955 wet season.

An article to appear soon describes a growth failure in a cane field because of a coarse sandy subsoil. This is not an infrequent occurrence in Queensland, particularly on alluvial lands. The Bureau's soil laboratory receives many soil samples from growers, taken from "good" and "poor" parts of the field and the accompanying particulars indicate that there is poor growth in patches in the field. Usually there is no difference in the analysis of the two soil samples and the conclusion is reached that some other factor—not related to soil fertility—is responsible for the growth difference. A trial boring with a soil auger would frequently disclose that the cause of the poor growth was a gravel or sand patch below the surface soil, which allows the subsoil to dry out more quickly.

The Bureau has been of the opinion for many years that decentralization of its services would be in the best interests of the industry. In conformity with that policy one of its pathologists, Mr. B. T. Egan, will be transferred to Meringa Experiment Station during 1955. He will be able to carry out on-the-spot investigations into disease problems in North Queensland and also to keep an eye on the progress of ratoon stunting disease control in the northern areas. Although gumming and downy mildew have been eradicated from North Queensland, as from the rest of the sugar belt, there are still several serious disease problems to be overcome; these include leaf scald, chlorotic streak and various stem rots.

The publication of Plowman's Folly some years ago set the agriculturists a major task in investigating the advantages claimed for leaving mulches on the surface as opposed to ploughing in all plant residues. It is easier to condemn a practice than to disprove the condemnation, but in the years that have passed considerable experimentation has thrown grave doubts on the

mulch-farming theory. Recently in the United States it has been shown that where corn was planted on normally ploughed ground the yields were better than where the previous crop residues were conserved on the surface. This was due to better aeration in the ploughed soil, higher temperatures in the ploughed soil (since there was no mulch to shade it) and better uptake of nitrogen by the corn plants. It is not suggested that mulch farming is no good—far from it. But such an investigation does point to the necessity for carefully examining any change in farming practice before switching over from the existing one. What suits corn in Iowa does not necessarily meet the requirements of cane in Innisfail.

A recent infestation of starlings in the South Johnstone area makes the following note of some interest although it applies to buildings rather than crops. It is from an American agricultural news-letter. "Do you have starling problems ? Do pigeons pester you ? Or maybe you live near the ocean and the gulls do a mighty messy job of painting the barn roof ! Whatever your beefs about the birds, you can humanely but firmly discourage their roosting around your home and other buildings on the place with the help of a new aerosol product. Developed by an Illinois laboratory, this bird repellent has been used successfully for a number of years in a form dispensed from a caulking gun for outdoor industrial maintenance work. The aerosol product, at the push of the button, lays down a ribbon of foam on places where our feathered friends are likely to light. This gelatin compound is said to be harmless to birds, but so disagreeable underfoot that they avoid it as they would a cat. The repellent is effective for a year or more after application, doesn't wash off, and is not dissipated by sunlight. It will cling to any metal, hard stone, wood, or other building material without staining, and shortly after application blends in with the colour of painted surfaces. From a safety standpoint, the manufacturer says it is nonflammable, odorless, and non-toxic to humans."

Field experiments with minor or trace elements have, as described in an article in this issue, failed once more to detect any deficiencies in sugar soils in the wet belt. It is now several years since the Bureau initiated these trials and only one small area in the Mackay district has shown a proven deficiency; in that case copper sulphate at 56 lb. per acre corrected the trouble. On first thoughts one would assume that if trace elements were deficient in our sugar soils the shortages would be most likely to occur in the heavily leached lands of the wet belt from Babinda to Tully but the current series shows no response to copper, zinc, boron, manganese, cobalt or molybdenum, or combinations of them. It is probable that the geologically complex origin of many of our sugar lands is the explanation.

It is becoming commonplace these days to read of agricultural chemicals which are tending to become less valuable because of nature's process of developing resistance to their action. Cattle ticks, which are resistant to arsenic and D.D.T., and mosquitoes and flies, which are no longer susceptible to D.D.T., are some cases in point. Field experience in Hawaii suggests that the weedicide 2,4-D is no longer as effective as it used to be as a pre-emergence spray. When 2,4-D is sprayed on to the soil surface it is gradually destroyed by soil bacteria, but the destruction rate is so slow that it still controls weed and grass seed germination for periods up to ten weeks. Recently in Hawaiian cane fields it has been noticed that, where the effective interval of control was previously six weeks, the control is now erratic but seldom exceeds ten days. Observations tend to support the belief that the bacteria which decompose 2,4-D have built up in the soil over a period of years and now destroy the weedicide in quick time. If these findings are confirmed the agricultural chemical manufacturers will doubtless seek new chemicals resistant to such form of decomposition.

With much of Queensland frequently thirsting for rain, a quick perusal of records for Innisfail, the centre of our northern wet belt, reveals some facts that must make interesting reading to land holders in drier areas. In 74 years since 1880, only six monthly periods, well separated, have passed during which no rain has fallen. The wettest year was in 1950, when some 222 inches were recorded. The driest year yielded 69.87 inches in 1902. The wettest month was in 1945, with some 65 inches. The wettest spell, although not containing some of the highest monthly recordings, appears to have commenced with 15 inches in October, 1933, to be followed with seven consecutive months of 24, 19, 36, 28, 32, 39 and 26 inches. Innisfail is not the wettest town in the north. Tully in 1950 registered 311 inches to claim an Australian record. Compare this 26 feet of rain with Birdsville's annual average of between five and six inches. Tully's figure is more remarkable when converted to weight; the 311 inches represented the amazing fall of 31,000 tons of water per acre.

The season just past produced some new records for the industry. The total cane crushed approximated 9,867,102 tons and was just 0.7 per cent. lower than the official Bureau estimate published in early November. Victoria mill handled 687,700 tons of cane with its dual milling train. Inkerman put 513,185 tons through the rollers during the season to establish a lead of 74,650 tons over any other single train mill in the State. The introduction of restrictive measures into the industry suggests that these records will not be broken for some time.

Seventy-six new legumes are at present under trial in Bureau plots in an attempt to find new green manure crops which are superior to existing ones. The velvet bean is hard to beat as a long fallow cover crop but it does not suit those growers who desire to plant cane in early autumn. The cowpea types we grow all suffer in varying degree from bean-fly or wilt and it is hoped that some of the newer introductions will be resistant to these affections. Those under trial include several of the mung bean type, and a large selection of cowpeas from various parts of the world.

Staff Promotions and Appointments

Promotions

Mr. R. W. Mungomery, Officer in Charge Division of Entomology and Pathology, has been promoted to Assistant to Director.

Mr. C. G. Hughes, Senior Pathologist II, has been promoted to Senior Pathologist I.

Mr. J. H. Buzacott, Senior Plant Breeder II, has been promoted to Senior Plant Breeder I.

Mr. N. McD. Smith, Adviser in Cane Culture, has been promoted to Senior Adviser.

Mr. O. W. D. Myatt, Adviser in Cane Culture, has been promoted to Senior Adviser.

New Appointments

Mr. J. D. Harland, B.Sc. (Ch.E.), has been appointed Asst. Mill Technologist with headquarters at Brisbane.

Mr. R. Deicke, B.App.Sc., has been appointed Asst. Mill Technologist with headquarters at Brisbane.

Mr. A. G. Barrie, B.Ag.Sc., has been appointed Asst. Agronomist with headquarters at Meringa.

Mr. J. R. Pollock, B.Ag.Sc., has been appointed Asst. Pathologist with headquarters at Brisbane.

Mr. L. S. Chapman, B.Ag.Sc., has been appointed Adviser with headquarters at Ayr.

Mr. G. H. Whitaker, Q.D.A., has been appointed Cadet with headquarters at Mackay.

Miss J. E. Murphy has been appointed Clerk-Typiste at Head Office.—N.J.K.

Mercurial Treatment of Cane Setts in the Innisfail and Tully Areas

By S. O. SKINNER

In the Innisfail and Tully areas, pineapple disease, while the cause of some indifferent "strikes" is seldom responsible for complete germination failures. Accordingly early opinions were that the mercurial treatment of cane setts, particularly as it would entail a departure from the popular "stick in the drill" method of planting, would be neither practical nor warranted.

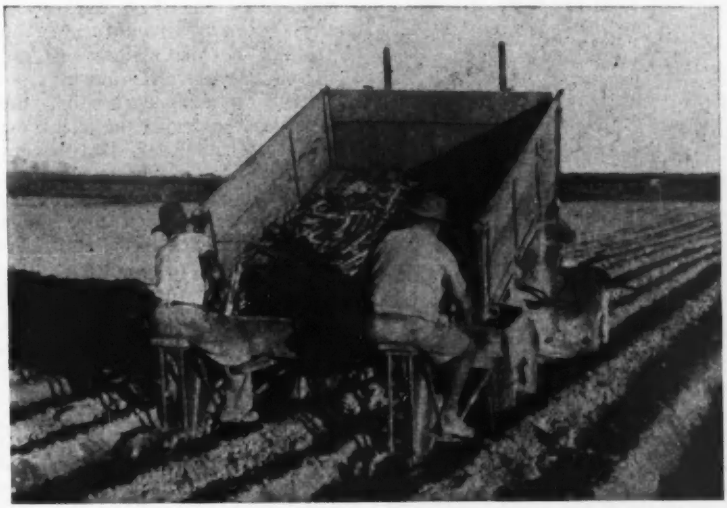

Fig. 88—A tip-body motor truck converted to a two-row planter by attaching chutes, seats and planter feet.

However, early demonstrations from farm trials showed a pronounced stimulation to cane germination, resulting in a much more rapid and even strike, and a thicker final stand. Growers were not slow to appreciate this benefit, since it is this stimulation that primarily attracts them; protection from possible pineapple disease infection becomes a secondary consideration.

The first stimulus to the changeover from the existing stalk method of planting came with the use of circular saws, when modest farm-made units were built to a limited extent. This was followed by the marketing of the Nuttall spray attachment for the cutter-planter. More recent still has been the Innisfail Blundell cutter-dipper-planter. This machine is a complete departure from the conventional type of cutter-planter inasmuch as the stalks are fed horizontally into a revolving drum which causes the sett to be cut off, carried down through the mercurial bath, and ejected into the planter chute as it emerges from the solution. Full details of this latest machine and its capabilities have appeared already in various sugar journals.

While these two machines, the Nuttall spray and the Blundell cutter-dipper-planter are used for the bulk of mercurial treatment in this area, individual growers have been devising their own units for their particular needs. One large and successful outfit is that made by Mr. T. Elston of Lower Tully.

Adding to earlier work by other growers, Mr. Elston has constructed a

portable unit comprising a circular saw, bath, and elevator with conveyor belt. The saw is 24-inch diameter, the bath of 40 to 50 gallon capacity, and the belt 10 inches wide with cleats 18 inches apart. The drive is from a 2 H.P. diesel engine mounted on the same frame. To achieve direct loading and

Fig. 89—The circular saw plant-cutting unit delivering dipped plants into the motor-truck planter.

planting, the grower uses a tip lorry as his planter. At the rear of this vehicle, a "trough" is fitted to the chassis to provide a ready supply of setts when planting. To this is attached two jockey seats, each with a light chute and planter foot and small discs, which are preferred to tynes, for covering.

In operation, the owner whenever possible, joins forces with his neighbour so that two lorries become available. Drills are opened by double row tractor equipment, the fertilizer being applied at the same time. Planting is then performed by a full lorry running up the drills, Fig. 88, while the second vehicle is at the saw being filled with plants. As the planter lorry is being emptied, the tip body is periodically raised. When empty, the rear units are quickly detached and left on the headland ready for fitting to the second vehicle.

Important features concerning the lorries are that they must be of short wheel base to facilitate easy turning on the headlands, and the tip body must pivot from the very rear. Otherwise any overhang would foul on the "trough" which, since attached to chassis, remains in a stationary position.

Each vehicle, with high sides, is capable of carrying sufficient cane for one acre of planting. During the filling process, the saw unit is coupled to the empty vehicle and the two move as one unit. Usually about four moves are made to fill each lorry, thus obviating undue carrying of bundles.

During the 1954 season, some 100 acres were planted by this outfit with complete satisfaction, while a second unit built and used by another grower covered much the same acreage. Previously the grower, using the stalk method of planting and basing output on eight men, planted in the vicinity of four acres per eight hour day. However with the new method, four men are sufficient for one lorry but planting is not continuous. Best use of the outfit is with two lorries and eight men, namely:—

1. Driving.
2. Dropping. These three attend to the two lorries changing vehicles as one is emptied and the other is filled.
4 Cutting down cane and using the saw.
1 Spending part of his time opening the drills and fertilizing, and part time helping with cutting.

With this eight men force as before, the grower now plants in the vicinity of seven or eight acres per day, *i.e.*, practically twice as fast as with his previous planting method. Other gains in addition to the mercurial treatment are:—

(*a*) Laborious work is reduced to a

Fig. 90—Side view of the plant cutter and motor-truck planter. Note trough on rear of truck body.

minimum; only the two men attending to the saw are constantly exerted. (*b*) The setts in the drill lie in a very straight manner; previously with cutting up in the drills, casual labour often left the setts in a disorderly fashion subject to poor covering and/or disturbance with drill cultivation. (*c*) Since there is some spacing between setts, a reduction of up to half a ton of cane per acre can be effected.

It has been mentioned, and will be observed from the photographs, that the loaded lorries run up the open drills when planting. Some readers will consider that this must pack the bottom of the drills very hard; it does. However, it may be explained that this running in the drills, quite distinct from surface compaction, is customary and beneficial to germination and early growth in this area.

In conclusion, it may be said, and quite rightly, that the foregoing equipment as constructed by Mr. Elston is applicable only to large annual plantings by one or more growers.

However, from mercurial treatment, two interesting sidelights arise. Firstly, despite the early obstacles, such as were forecast in this area, whereby a departure from the popular stalk method of planting would be necessary, the several outfits devised for mercurial treatment by dipping and spraying have introduced new and more efficient methods of planting. Secondly, the units demonstrate the important part played jointly by science and the grower. On one hand a new application to farming is introduced and on the other successful means for its adoption are quickly devised.

Caution in the Choice of Cane Plants

By R. W. MUNGOMERY

Probably uppermost in the minds of most growers at the present time, insofar as sugar cane diseases are concerned, is the widespread occurrence of ratoon stunting disease and the consequent necessity for securing clean planting material in the campaign to combat it. To provide for this, many growers have established plots of hot-water-treated cane from which they expect to be able

to draw their future planting requirements, and by dint of careful forethought in the choice of planting sites, scrupulous attention to detail in farm hygiene, and timely propagations, several are now well on the way to having their farms completely disease-free.

In other cases there has been a tendency to overlook any disease other than ratoon stunting, and as a result the choice of planting sites for this clean cane has not been quite so fortunate. In consequence other diseases have subsequently crept into what should have been blocks of clean cane and rendered them highly dangerous if they are still regarded as sources of planting material. Particularly has this been the case on the low-lying wet areas of North Queensland which are subject to chlorotic streak infection, and on the river bank farms of South Queensland where mosaic disease is still likely to constitute a problem if susceptible varieties are propagated in these situations.

Because of the insidious nature of chlorotic streak disease and the masking of symptoms at certain times of the year, it is generally agreed that it is inadvisable to attempt to rogue diseased stools in low wet situations; consequently where chlorotic streak is found such fields should be classed as diseased and written off as sources of planting material. However, in some districts such as Bundaberg, where chlorotic streak is not known to occur, mosaic disease may be the only contaminant of these otherwise clean plantings. This disease which is characterized by a light and darker green mottling of the leaves is usually easy to recognize, although in some varieties, such as Q.50, the mosaic pattern may be less distinct and more difficult to detect. Nevertheless, by roguing all stools affected with mosaic it is possible to re-establish a clean source of planting material.

Although the river bank farms with their grassy surroundings were cited as areas most liable to mosaic infection, there can be no guarantee that odd diseased stools may not appear in some of the higher and drier fields of susceptible varieties growing miles away from the rivers. In fact some of the hilly country in the Gin Gin mill area used to be notoriously bad for the spread of mosaic disease when susceptible varieties were grown there years ago. Therefore, there can be no grounds for anyone to assume that once a field is planted with clean cane it will remain healthy indefinitely. Consequently each grower should alert himself to the possibility of disease encroaching into his clean seed plots and he should satisfy himself that his planting material is satisfactory before he decides to use it. If a grower has any doubts on that score he has merely to request the services of the Supervisor of the local Cane Pest and Disease Control Board or of a Bureau officer, when the cane will be examined and he will either be reassured regarding its suitability or else he will be advised of other sources where reliable planting material is available.

Mr. C. G. Hughes to go Overseas

The Sugar Experiment Stations Board decided at a recent meeting to send the Bureau's senior pathologist (Mr. C. G. Hughes) overseas for a period of about four months. Mr. Hughes will visit centres of plant pathology research in Europe and the United States, and will place special emphasis on modern investigations into virus diseases of plants.

The major disease problem of the Queensland sugar industry at present is ratoon stunting disease and determined efforts are being made to control and eradicate it during the coming years. The success achieved in the past in eliminating gumming and downy mildew diseases, and the eradication of Fiji disease which is now in sight, prove that complete disease eradication is practicable. Similar success with ratoon stunting disease will be assisted by a better understanding of the virus which causes it. Considerable value may accrue from a study of other virus diseases in other crop plants and from discussions with leading research workers in other countries.